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ABSTRACT

Educators need to better understand how Internet discussion boards can be used in their classrooms. The process of trying to learn more about potential efficacy of a merger of two potent education tools (Learning or Literature Circles and online discussion boards) is currently underway. A large research study has been designed to examine the efficacy and impact of Virtual Learning Circles, applied in a variety of content areas, upon student growth on a number of literacy variables. Primary research addressed in this small part of the large study is this: What is the relationship between the cognitive complexity seen in student discussions board writing with some other common literacy/educational variables? What literacy variables seem to predict high cognitive complexity in student discussion board responses? Subjects, 115 students stratified across elementary, secondary, and collegiate levels are from Missouri. Nine interval-scale-data variables were examined and correlated using a simple "r"; analysis focuses on relationship between discussion board cognitive complexity and the other variables. Findings suggest high relationship between reading ability and higher-order literacy and discussion board cognitive complexity; high relationship between discussion board cognitive complexity mean score and the high score of the same is statistically logical to some degree; high relationship between attitudes toward school and self-perception with discussion board cognitive complexity needs to be examined further; and the small "negative" correlations between discussion board cognitive complexity and reading maturity, technology skills, and frequency of responses raises interesting ideas. (Contains 2 tables and 24 references.) (NKA)

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VIRTUAL LEARNING CIRCLES: UTILIZING ONLINE MESSAGE BOARD INTERACTIONS FOR STRENGTHENING LITERACY DEVELOPMENT

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Introduction

General Statement of the Problem

We need to better understand how internet discussion boards can be used in our classrooms. This is especially so as we try to sensibly blend new and potentially powerful learning tools like discussion boards with other traditional and popular approaches to literacy instruction. To do this, we are currently in the process of trying to learn more about the potential efficacy of a merger of two potent education tools: Learning or Literature Circles and online discussion boards (Hofmeister & Thomas, 2001). Currently it is believed that Literature Circles (Daniels, 1994, 2001) help students interact at deeper affective and cognitive levels regarding literary texts. It is also believed that this sort of interaction around text has similar value to non-fiction writing as well (Daniels, 2001; Western Canadian Protocol, 2001), thereby bringing about the concept of Learning Circles rather than strictly Literature Circles. Additionally, as new internet technology continues to enter our schools, it is believed that online discussion boards have great potential to increase the literacy development (including cognitive and affective domains) of participating students (Thomas, 2001a). The problem is that it is not yet well know how to most effectively fine-tune the combined usage of these two teaching technologies in order to yield optimal student growth (Hofmeister & Thomas, 2001; Harasim, 2001). What is needed is carefully designed teaching methods, practices, and strategies that most effectively combine Learning Circles with online message boards, hence the term (coined by the researchers of this study): Virtual Learning Circles. The larger research study, of which this short paper is but one small part, therefore, has been designed to examine the efficacy and impact of Virtual Learning Circles, applied in a variety of content areas, upon student growth on a number of literacy variables.

Review of the Literature

Literature Circles. Book clubs are forming in classrooms all across the country, with small groups of students from kindergarten through high school leading their own lively discussions. This encouraging movement draws many of its key ideas from Harvey Daniel's promotion of Literature Circles (Daniels, 1994, 2001). Literature Circles are small-group structures for reading and discussing fiction or non-fiction texts across the curriculum. They combine two important educational constructs: independent reading and collaborative learning. Daniels describes Literature Circles as student-led discussion groups of three to six students who choose and read the same article, book, or novel. To encourage more active participation, students are asked to prepare for each group meeting by keeping a response log, jotting down discussion ideas while reading. The circles meet regularly and the students use their notes to feed the discussion. When they finish a book, each circle typically reports the highlights of their discussion to the whole class or creates a formal project that shares their learning. Then these small groups dissolve, students select more readings, and new groups are formed around these choices (Daniels, 2001).

Anecdotal evidence seems plentiful regarding the value of Literature Circles for increasing student interest in reading and depth of reading analysis and interaction (c.f. Brown, 2000; Tierney & Readence, 2000; Western Canadian Protocol, 2001). However, quantitative research on the *efficacy* of Literature Circles, while growing, still seems to be in developmental stages. Research on classroom activities approximating the use of Literature Circles (combined with other literacy strategies) has shown some measure of: increases in instructional reading levels and increased intrinsic motivation to read for enjoyment (Fabrikant, Sickierski, & Williams, 1999). Literacy Circles imbedded with multiple intelligences approaches has led to

increases in at-risk elementary students' attitudes towards academic and recreational reading; an increased interest in specific authors when choosing a novel; and an increase in grade level reading comprehension (Parker, Quigley, & Reilly, 1999). Gunning (2002) reports that cooperative learning principles embedded in Literature Circles "work well" with low-achieving readers. It is also reported that literature circles can be used successfully with bilingual students at various grade levels (Martinez-Roldan & Lopez-Robertson, 2000).

Online Discussion Boards: The flexibility of on-line discussion boards enables students to use the Web to manipulate information and facilitate communication through an interesting and varied instructional medium (Mioduser, Nachmias, Lahav & Oren, 2000). Variety comes through the discussion boards when they are developed along a specific instructional model allowing for an interaction style that encourages different levels of cognition. For example, the use of reconstructive and constructive discussion boards prompts seems to elicit differing levels of student writing complexity and cognitive complexity depending on the type of prompt (Thomas & Hofmeister, 2002). Interactions involving unique educational environments and diverse perspectives also seem to be a positive feature of discussion boards. For example, Carico (2000) found that eighth graders, linked to college students via discussion board interactions appreciated being able to "speak" more freely and anonymously than they could in class, while the college students appreciated opportunities to discuss literature with adolescents. Both groups were surprised at the number of in-depth issues they discussed.

An important feature of discussion boards is their asynchronous nature, allowing for messages to be posted and read later and responded to by other students, along with their potential for building extended threads or discussions involving multiple interactions. The opportunity to add information to the discussion is nearly limitless as long as students have the

time, access, and inclination to participate. When discussion boards are coordinated between schools, students from different cultures, regions, religions, ages, perspectives, and with a range of physical and mental strengths can work together in a medium that is intellectually rich. Then literature, content knowledge, ideas, and beliefs can enhance learning as students construct shared understandings. Consequently, the discussion board interactions blend instructional processes with students whose social and physical world is similar to and different from that of their distant partners (Riel, 2000). Thomas and Grigsby (2001) reported that discussion boards also seem to have these strengths: utilization of the enduring nature of digital conversations; the opportunity for common text resources online; the potential for more precise grading of informal student interactions; increased student participation; and an increased emphasis on student thoughts and reflections, rather than on personalities or classroom social stigma/interference (reducing the medium-is-the-message dynamic).

Literacy Development Resulting from Online Discussion Boards: At this time the research about the literacy development resulting from online message board interactions is quite sparse, save for a few preliminary studies such as those of the researchers of this report (c.f. Hofmeister & Thomas, 2001; Thomas & Hofmeister, 2002). However, the research community is beginning to make logical appeals for how potentially valuable the concept of Virtual Learning Circles may be in the near future (c.f. Tierney & Readence, 2000; Thomas, 2001a). Tierney and Readence summarize this potential quite well in their new reading strategies book when addressing traditional Literature Circles. They write:

> "Literature Circles lend themselves to use with technologies. Chat rooms and threaded discussions might be adapted or incorporated with elements of Literature Circles in meaningful ways that afford discussions without need for proximity in either time or place. Chat rooms could invite folks from around the world to discuss a text at the same time; threaded discussions could allow for extended discussions (sometimes over weeks) through the use of e-mail. A powerful characteristic of these discussions might be to have a written

record, so that shifts in understanding, perspective, or contributions can be monitored" (pp. 300-301).

It is the quantitative analysis of these sorts of written records, designed to measure the efficacy of Virtual Learning Circles, that the larger vision of this research study strives to address.

Specific Hypotheses and Research Questions

For today's short research report, the primary research to be addressed is simply this: What is the relationship between the cognitive complexity seen in student discussion board writing with some other common literacy/educational variables? That is, what literacy/educational variables might seem to predict high cognitive complexity (quality) in student discussion board responses? This seems like logical starting place that will allow us to move forward in the future into more complex analysis of relationships and of causation/efficacy.

The larger research project of which this paper is but a very small part is in the process of trying to address the following hypotheses and research questions that will hopefully tell us more about causation and efficacy of the use of discussion boards.

Hypotheses:

1. Participation in Virtual Learning Circles will result in increased growth in basic reading ability.
2. Participation in Virtual Learning Circles will result in increased growth in reading maturity
3. Participation in Virtual Learning Circles will result in increased growth in higher-order literacy

4. Participation in Virtual Learning Circles will result in increased growth in writing complexity.
5. Participation in Virtual Learning Circles will result in positive growth in attitudes toward school.
6. Participation in Virtual Learning Circles will result in increased growth in self-perception.
7. Participation in Virtual Learning Circles will result in increased growth in attitudes toward using technology in learning activities.

Research Questions: The research questions to be examined in this study are as follows:

1. What impact does access to technology (minutes, ratio of computers to students, amount of money given to technology) have upon student growth in the variables of this study?
2. What impact does teacher moderation in the discussion board interactions have upon student growth in the variables of this study?
3. What impact does demographical issues in the different participating schools have upon student growth in the variables of this study?

Significance of the Proposed Study

This overall study may be seen as important because the findings could provide educators with more information to help with understanding the potential efficacy in the fusion of two seemingly complimentary and potent educational tools: Literature Circles and Internet message boards. This is an important step in continuing to delineate the results of combining traditional literacy instruction with the technological tools of 21st Century.

Design and Methodology

Subjects

The subjects in this study (of our current data set) are students stratified across elementary, middle-school, high school and collegiate levels, all from the State of Missouri. The students also represented, to some degree, stratification across urban, rural, and suburban backgrounds. Approximately 115 students participated in this current phase of this study: 25 elementary students (4th grade); 50 middle school students (7th and 8th grades); 20 high school students (10th grade); and 20 college students (undergraduates).

Selection of participants in this study was based on researcher contacts from the various populations desired. Targeted groups include elementary, secondary and collegiate students and teachers from urban, rural, suburban, and international schools. The teachers in this study were contacted by the researchers and invited to have their students participate. The participating K-12 teachers from Missouri were informed that by joining in this study they were to be paid $250.00 each, for their initial participation, from a research grant from their state.

Variables and Assessment/Instrumentation

There were nine interval-scale-data variables that we examined for this short paper. Table 1 delineates the variables and the assessment/instrumentation that will be used for each.

Table 1: Variables and Instrumentation

Cognitive complexity of discussion board responses	The *Writing and Cognitive Complexity Discussion Board Rating Scale* (Thomas & Hofmeister, 2001).
Reading ability	The *Accuracy Level Test* (Carver, 2000)
Attitudes toward school	The *School Attitudes Inventory* (Thomas, 2001b)
Reading maturity	The *Reading Survey* (Thomas, 2001a)
Higher-order literacy	The *Measure of Higher-Order Literacy* (Thomas, 2001a)

Self-perception	*Manzo's Bestiary Inventory* (Manzo & Manzo, 1993, p. 153)
Frequency of responses	Simple counting
Best response	Highest single score (per student) for cognitive complexity
Attitudes toward technology/technology skills	*Discussion Board Basic Skills Profile* (Hofmeister, 2001)

Research Design

For this small, initial phase of the research, the variables above were correlated using a simple *r* and the analysis reported in this short paper focuses on the relationship between discussion board cognitive complexity and the other variables. In the next phase of the larger research study we intend to complete a pretest-posttest control group design (Campbell & Stanley, 1963) for assessing student growth on the variables at hand in order to test the hypotheses described earlier. Other correlational analyses will be conducted as well in order to examine the three larger research questions of this study mentioned earlier.

Procedures

Each student participating in Virtual Learning Circles was presented with a general overview of the research study, had parental permission (for minors), and personally agreed to participate.

After each student agreed to participate, obtained parental permission (for minors), and submitted signed permissions to the teacher, the students created and submitted a moniker and a password to the teacher or received a teacher-supplied moniker and password. The teachers compiled the student names, add their own names to their lists, and sent the list and the permission forms to the researchers. The researchers added the student monikers and passwords into a BlackBoard ™ website specifically developed for this research study so that students could access the Discussion Board (the name BlackBoard ™ uses for message boards) to be used

for the Virtual Learning Circles Modules. Except for instances where the researchers' own college students were participating, there was no face-to-face contact between the researchers and the students where student names and faces could be associated with each other. Additionally, except for instances where the researchers' own college students are participating, all participants were anonymous to the researchers, due to the use of student-chosen monikers and passwords. Only the participating classroom teachers had the documentation for connecting the participant monikers to their actual identities.

A set of instructions for accessing the BlackBoard ™ website was provided to each participant in the study. Participants accessed the website (http://courses.cmsu.edu/?bbatt=Y) and logged in from their school or personal computers. The website did not permit guest access. Once the successful login occurred, students were guided to the Small Group and Discussion Board sections of the website. There the students accessed the specific Discussion Board threads (through the Virtual Learning Circle Modules) being used, read others' comments and made personal comments under the assigned moniker. Discussion Board prompts covered shared online textual readings.

On the Discussion Board the researchers posted the Virtual Learning Circle Modules containing the prompts that the students read and then responded to; they all were directed to respond to information posted by other students in the study. Prompts were organized relative to the instructional activity.

Distinctive features built into the design of each Virtual Learning Circles Module included:

- A common online text to read;
- A reconstructive writing prompt (using the About-Point method);

- A constructive writing prompt -- "The section that I read makes me think about...";
- Directions to interact with fellow students by posting three replies (could include replies to replies as well);
- Gambits for adding a personal/human feel—addressing each person by name and signing each comment;
- Directions for the mechanical steps to be taken to complete the above tasks.

Results

Data Analysis and Results

For the larger aspects of this study, the data will be analyzed using a number of statistical procedures. Pre- and post-testing results on the appropriate variables will be analyzed for both statistical significance and for measures of effect size. Other variables will be interrelated using a variety of correlational procedures, include r, multiple R, and factor analysis. For the simple results examined here, the data was analyzed using simple correlational procedures.

Table 1 shows the correlations between discussion board cognitive complexity and the other variables in this part of the study. It should be noted that the highest correlations with cognitive complexity of discussion board responses were with: best responses (.788), reading ability (.544), and higher-order literacy (.487), and that these would be considered highly related, or very nearly so, using Cohen's Criteria (1977). It also should be noted that self-perception (.105) and attitude toward school (.147) had only small effect size relationships with cognitive complexity of discussion board responses. Finally, it should be noted that there were small *negative* correlations between discussion board cognitive complexity and reading maturity (-.023), technology skills (-.089), and frequency of responses (-.166).

Table 1: Correlation between Cognitive Complexity of Discussion Board Responses and Other Variables

Other Variables	Correlation with Discussion Board Cognitive Complexity (mean score of each student's discussion board responses)
Reading ability (N = 101)	.544
Attitude toward school (N = 97)	.147
Reading maturity (N = 100)	-.023
Higher-order literacy (N = 99)	.487
Self-perception (N = 100)	.105
Frequency of responses (N = 102)	-.166
Best response (N = 91)	.788
Technology skills (N = 98)	-.089

Discussion

The following simple observations can be made regarding what we may have learned from this data so far (without inferring causation):

1) That there is a high relationship between reading ability and higher-order literacy and discussion board cognitive complexity is something that would be predictable—doing a good job with discussion board writings is a reading and writing (literacy) activity and we would expect that students who read and write well would be the ones who would do well with the discussion boards. However, the fact that there is not a higher relationship (i.e. heading towards 1.00) indicates that within this aggregate data we may have some students who read and write well in conventional settings but did not do as well when in the new environment of online discussion boards. And, conversely, we may have some isolated or individual students who do not

necessarily read or write as well in traditional educational settings who, due perhaps to the increased motivation provided by online discussion board interactions, perform higher than they usually do when engaged in this form of a literacy activity. Future scrutinizing of the data collected is needed in order to try to identify these potentially important aspects of the findings.

2) That there is a high relationship between the discussion board cognitive complexity mean score and the high score of the same is statistically logical to some degree, as it is the latter which partially impacts and forms the former. However, this also shows us the potential character of student discussion board responses; students who write solid responses are not as apt to also be writing unsubstantial responses, and vice-versa. Anecdotally this was also observable by those analyzing the data.

3) The small-sized relationship between attitudes toward school and self-perception with discussion board cognitive complexity need to be further examined. It is possible that the variables/instruments used to measure attitudes and self-perception were inadequate or need some further fine-tuning. It is also possible that there is just not much predictive power in these variables when it comes to the quality of discussion board responses. And finally, it is possible that these are some crucial trace-element sorts of variables that do have a small, but important relationship with discussion board writing. Further research is needed on this topic.

4) The small *negative* correlations between discussion board cognitive complexity and reading maturity (-.023), technology skills (-.089), and frequency of responses (-.166) raise some interesting ideas. The low correlation with reading maturity is most likely an anomaly and should not be considered much in this study. The reason for this anomaly is that the reading maturity instrument needs further scoring refinements to be more sensitive to issues of age and grade.

The low negative relationship between discussion board cognitive complexity and technology skills could indicate that doing a good job with discussion board interactions does not require a great deal of technological/computer savvy. It is much more of a literacy activity than a technology activity (even though, in reality, it does involve a number of the computer's valuable capacities). The negative correlation may actually show that too much computer savvy actually detracts from the quality of the student writing and interactions (i.e. some students might be having too much fun clicking around, making shallow responses, rather than focusing on the reading, writing, thinking task at hand).

Finally, the low negative relationship with frequency of responses may indicate that indeed, less can be more; writing a lot of discussion board messages did not seem to have much relationship with writing high-quality discussion board messages. That is (as anecdotal observations of this data also would support), it seems that some students had a tendency to post a relatively large number of shallow/short responses, rather than taking their time to carefully craft fewer but higher-quality responses; some of the best postings came from students who only posted a relatively few number of responses.

Further Research Suggested

As mentioned earlier, this research study is a work-in-progress and there is a tremendous amount of important research yet to be done on this topic. Certainly we feel that the unfinished portions of what has been mentioned here need to be addressed (including the pre-test/post-test design to measure the efficacy of virtual learning circles on students' overall literacy development). This should also be done with a participant population better stratified at each grade level across socio-economic lines and ideally would involve international students as well.

We also feel that a closer connection to the essential components of traditional literature circles is needed (such as student-selected reading materials). The structure and format of the VLC Modules will need continual revision.

Finally, looking more long-term, we are very interested in moving this line of inquiry into a position of truly benefiting as many students as possible around the world. We feel that there is some great humanitarian potential in the use of Virtual Learning Circles. We would like to begin focusing on how Virtual Learning Circles could be used to leverage underprivileged persons by increasing their access to cultural and intellectual capital. There is a proverb which says "He who walks with the wise grows wise" and it seems that discussion board interactions may provide increased avenues for people to "walk with the wise" and learn from one another. It seems to us that some of the difficulties faced by the many disenfranchised people in this world are not issues so much of money (as is commonly thought) but are instead issues relating to poverty of cultural and intellectual capital (i.e. the opportunity to communicate, converse with, and learn from the cultural and intellectual resources of other good people around the world). We feel that this sort of interaction, now available for the first time through discussion boards, may be a very powerful agent of global educational and humanitarian improvements. This is all down the road some distance still, but is a vision very clear to us as we try to put these little pieces of the Virtual Learning Circles research together.

Conclusion

It is hoped that today's short paper presentation has been beneficial to the conference participants. Hopefully we have been able to:

- share some of the theoretical value of discussion boards;
- show some VLC modules in action;

- show some of the qualitative and quantitative findings that are emerging to date;
- provide some food for thought regarding what literacy education might be about in the 21st Century;

What we would really like to do now is invite your participation and contributions. We would very much like to have other schools from around the world join us in the next phase of this research which we will hopefully be starting in the fall. Any feedback that you have for us would be very much appreciated as we continue to search for new insights into the impact and efficacy of using Virtual Learning Circles in our classrooms.

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